C-130 IMPEX / INTEX-B Flight summary

date: 28 April 2006 (20060428)
flight number: 5

Take-off: 17:01:49 GMT
Landing: 00:58:43 GMT

Objectives:

- sample northern part of Asian pollution plume
- sample a pool of older pollution north of the Asian pollution
- learn the models' predictive capabilities for Asian plumes
- spiral under an OMI satellite overpass

Instrument status:
All instruments, except SABL and HNO_3 in 4-channel CIMS, were operating.

Flight summary.

The C130 flight went as planned, except for a 20 minute hold at 18 kft by ATC, slightly northwest of the frontal high clouds.

On the way out, south of the front, were fairly clean layers, except at 13-15 kft, where enhanced NO_y species were detected. Other than these enhanced NO_y layers on the spiral, the CO, O_3, NO_y, and particle vertical profiles were the same for the ascent out of Seattle, the spiral, and the ascent just to the south of the frontal zone.

Through the front, the air was fairly clean. It remained fairly clean even across the high frontal clouds and over the cloud deck at ~6-10 kft on the northwestern side of the front. Sulfur species were often observed just above the cloud deck associated with the front.

Obvious, thin, dark pollution layers appeared once the cloud deck gave way and the ocean could be seen though broken clouds. A spiral down revealed the locations of pollution layers, which were less than a few 1000 ft. thick. The C-130 then rose rapidly up to 12.8 kft, and stayed in a layer until it weakened. Peak CO values exceeded 190 ppbv. Other pollutants were also enhanced. An additional layer was found on ascent at 18 kft, with CO reaching 250 ppbv. Other pollutants were measured in these layers.

Further north, the pool of old pollution was found. CO was steady at 150 ppbv for all altitudes and all profiles. NO_y species were generally quite low. At the northernmost end, the C130 began to enter the lower stratosphere, where CO decreased to below 130 ppbv and O_3 exceeded 200 ppbv. NO_y species also increased.

The measurements on return were similar, except that the front has pushed to the east and the location of the more recent pollution plume had moved with it.

Overall summary. Consensus is that this was a very interesting flight. All the objectives were met, except in-progress descents were done for OMI and not spirals.